Subclavicular Pectoralis Major Myocutaneous Flap for Optimal Reconstruction of Large Orbitozygomatic Defects: A Case Report

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Abstract

Since the introduction of microvascular free flaps, the pectoralis major myocutaneous flap (PMMF) has been relegated to background for most reconstructive surgeons. The objective of this article is to show the advantages of cervicofacial defects reconstruction with PMMF using the subclavicular plane route in a challenging clinical case. An 83-year-old man presented with cutaneous temporomalar lesion with orbital spread. Tumor resection was performed, including 12 × 11 cm skin and subcutaneous tissue, overlying zygomatic and malar bone, and orbital exenteration. Radical parotidectomy and functional neck dissection were performed. PMMF was chosen as reconstructive option routing the pedicle to the subclavicular plane. The length of the pedicle was 31 cm. The subclavicular route for PMMF increases the flap's length and arc of rotation compared with the conventional supraclavicular one. This procedure decreases the bulk of the PMMF pedicle which makes it functionally and cosmetically favorable. By using this modification, we may widen the “safe” reconstructive possibilities.

Keywords

- ▶ pectoralis major
- ▶ subclavicular route
- ▶ orbitozygomatic
- ▶ reconstruction

The pectoralis major myocutaneous flap (PMMF) has long been used in head and neck oncologic reconstruction defects. The versatility of the vascular pedicle, and its proximity to the several surgical defects created in the region, established this flap as the standard procedure for large head and neck reconstructive defects in the 1980s and 1990.¹ However, since the introduction of microvascular free flaps, the PMMF has been relegated to background for most reconstructive surgeons.^{2–4}

However, this flap is still used in head and neck reconstruction, especially after resection of locally advanced tumors, as a salvage procedure after microvascular free flap failure, or when there is lack of infrastructure to perform microsurgical reconstruction.

Subclavicular route for the pedicled PMMF allows filling large areas as described earlier, and especially in those involving the upper half of the head.^{5,6}

The authors present a patient with orbitozygomatic squamous cell carcinoma. A thorough discussion is performed

based on the surgical advantage obtained with the technical refinement of PMMF by using subclavicular route dissection as reconstructive option.

Case Report

An 83-year-old man presented with left temporomalar skin tumor with orbital extension. He underwent a previous surgery for cutaneous squamous cell carcinoma in the same area, performed in another hospital, about a year ago. Diagnosis of recurrent squamous cell carcinoma was confirmed by incisional biopsy.

Currently, physical examination corresponded to left eyeball cellulitis and temporomandibular malar edema, with subcutaneous tissue involvement in an area of approximately 10 cm diameter around the pterional frontomalar region. Orbital ecchymosis scleral venous return compromise with intense local swelling.

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Ophthalmologic examination showed preserved visual acuity with no restriction of external ocular motility.

The tomographic image described the absence of infiltration through the optic foramen but orbital cone involvement with fatty infiltration without boundary of the external oblique muscle. Lateral malar bone presented periosteal reaction (as) and zygomatic bone erosion in the inner third. Subcentimeter parotid lymphadenopathies were observed with no central necrosis.

Under general anesthesia and tracheal intubation, "en bloc" tumor resection was performed, including 12 × 11 cm skin and subcutaneous tissue, underlying malar bone, and zygomatic and orbital exenteration (►Figs. 1 and 2). Surgical treatment was completed involving radical parotidectomy and ipsilateral functional neck dissection. Intraoperative biopsies of surgical excision margins were tumor free.

Because of atherosclerosis, cardiopathy, and advanced age, pedicled PMMF was chosen as reconstructive option for tunneling the flap via the subclavicular route.

Pectoralis muscle flap dissection was performed according to the conventional technique. The flap was raised toward the coracoid process and after reaching the clavicle, the pedicle was completely skeletonized. By doing this, all the small muscle perforator vessels should be linked. At this point, starting at the upper edge of the clavicle, a subperiosteal tunneling was performed from cranial to caudal, reaching a path spacious enough to allow the baggy passage of three fingers of the surgeon. This reference measurement will allow the transference of the pectoral muscle flap without compression of the pedicle (►Fig. 3).

Figure 1 Tumor resection with margins free of carcinoma.

Figure 2 Defect after surgical ablation. Resection involves the orbital cone, orbitomalar buttress, temporalis muscle, the body of malar bone, and zygomatic arch. The skin defect was extended 6 cm above the left orbital rim.

Once the flap was in cervicofacial region, the pectoralis major muscle laid out below the sternocleidomastoid muscle to avoid dead space and tension on thoracoacromial vessels. The skin paddle of the flap was anchored with three osteosynthesis screws in the supraorbital rim or frontotemporal region, to prevent sagging of the flap (►Fig. 4). The procedure was performed by a surgical team working on a single field. After complete dissection of the flap including the subclavicular passage, the pedicle length obtained was 31 cm. This last maneuver helped to increase the arc of rotation of the flap, reaching the cephalic region of the defect up to 6 cm from the brow's tail, without tension. Also, this procedure resulted in a decrease in the volume of the flap along the vascular pedicle and besides optimal filling of surgical defect (►Figs. 5 and 6).

Total surgical time required was 7 hours and 50 minutes. The patient required transfusion of two packed red blood cells

Figure 3 Subclavicular pectoralis major myocutaneous flap (PMMF) laid out below the sternocleidomastoid muscle (SCM) to avoid dead space and tension on thoracoacromial vessels (arrow indicates the clavicle location).

Figure 4 Skin paddle reach adequately the defect. Crucial interest in the vascular pedicle which must present neither tension nor torsion of the vessels.

Figure 5 Surgical reconstruction without tension reaching the frontal region of the defect and direct closure of the donor site. The subclavicular route avoids the unaesthetic increased volume in the cervical region.

Figure 6 Eight-week follow-up just before starting radiotherapy.

units and remained 24 hours at the intensive care unit. The immediate postoperative chart was uneventful: adequate pain control with conventional analgesia and early deambulation on the 3rd postoperative day. Surgical fields showed no wound dehiscence and the flap did not present sagging or hematomas.

Donor-site closure was achieved primarily and healed without complications. It also showed considerable aesthetic and functional improvement at the cervical level, decreasing the volume of the pedicle in comparison to the supraclavicular route.

Discussion

Over the past two decades, the use of PMMF as the first reconstructive choice has been restricted to extensive defects created in stage III carcinomas and recurrent disease.⁴⁻⁷

Compared with local flaps (e.g., temporalis myofascial flap),⁸ it provides a larger coverage, up to 100 cm². In addition, limitation of the temporal muscle flap is due to the transferred volume, and, in case of orbitomalar tumors, resection margins often involve the flap needing to include the temporal muscle in the oncologic resection.

According to Chepeha et al,² PMMF complications rates are comparable to those of microvascular flaps. The main criticism of PMMF in matching the largest series published in the international literature in recent years^{2,3,9,10} is related to its poor vascular supply to the distal portion of the skin paddle, especially when the cephalic region of the defect is located above the labial commissure. In these cases, flap design must

be positioned below the sixth rib cartilage to try to reach the area to be reconstructed. At this region of the chest wall, the pectoralis musculocutaneous perforators are dramatically decreased along with the skin flap irrigation.

In addition, we should consider the need of longer vascular pedicle to try to reach orbitozygomatic defects, as seen in this patient, such as the risk of partial dehiscence, fistula, infection, and consequent prolongation of hospital stay.

In our clinical practice, these limitations are highly minimized by dissecting the pedicle pectoralis major via subclavicular route. This result goes in accordance with other authors who previously reported their experience on larger series.¹¹

The greater length of pedicle obtained reduces the risk of wound dehiscence at the apex of the defect. It also lowers the risk of compressing the pedicle in the cervical region and improves the aesthetic result.

This technical refinement may allow the PMMF to be considered as a more frequent reconstructive flap rather than more technically complicated procedures, involving microvascular free tissue transfer, both in patients with advanced tumor stages, as seen in the elderly, and significant comorbidity patients.

Conclusion

The subclavicular route for PMMF increases the flap's length and arc of rotation without compromising the vascular supply compared with the conventional supraclavicular one. This procedure decreases the bulk of the PMMF pedicle which makes it functionally and cosmetically favorable. By using this modification, "safe" reconstructive possibilities can be widened.

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